

Image AF/1713

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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 320

Complete if Known

Application Number	09/699,723
Filing Date	October 30, 2000
First Named Inventor	Goldstein, Joel
Examiner Name	Riddick, Marie L.
Art Unit	1713
Attorney Docket No.	06076 USA

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 01-0493
Deposit Account Name: Air Products and Chemicals, Inc.

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 770	2001 385	Utility filing fee	
1002 340	2002 170	Design filing fee	
1003 530	2003 265	Plant filing fee	
1004 770	2004 385	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	

SUBTOTAL (1) (\$) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	0
Multiple Dependent	-3** =	X	0

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description
1202 18	2202 9	Claims in excess of 20
1201 86	2201 43	Independent claims in excess of 3
1203 290	2203 145	Multiple dependent claim, if not paid
1204 86	2204 43	** Reissue independent claims over original patent
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) 0

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code (\$)	Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 420	2252 210	Extension for reply within second month	
1253 950	2253 475	Extension for reply within third month	
1254 1,480	2254 740	Extension for reply within fourth month	
1255 2,010	2255 1,005	Extension for reply within fifth month	
1401 330	2401 165	Notice of Appeal	
1402 330	2402 165	Filing a brief in support of an appeal	320
1403 290	2403 145	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,330	2453 665	Petition to revive - unintentional	
1501 1,330	2501 665	Utility issue fee (or reissue)	
1502 480	2502 240	Design issue fee	
1503 640	2503 320	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 770	2809 385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 770	2810 385	For each additional invention to be examined (37 CFR 1.129(b))	
1801 770	2801 385	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 320

SUBMITTED BY

(Complete if applicable)

Name (Print/Type)	Mary E. Bongiorno	Registration No. (Attorney/Agent)	36091	Telephone	610-481-8820
Signature	Mary E. Bongiorno	Date	04/05/04		

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DOCKET NO.: 06076 USA

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**IN RE APPLI-
CATION OF** : Goldstein, et al. : **CONFIRMATION NO.:** 6932

SERIAL NO. : 09/699,723 : **GRP. ART UNIT:** 1713

FILED : October 30, 2000 : **EXAMINER:**Reddick, Marie L.

FOR : **REDUCED FORMALDEHYDE NONWOVEN BINDERS WHICH
CONTAIN POLYMERIZED UNITS OF N-METHYLOLACRYLAMIDE**

CUSTOMER NO. : 23543

Commissioner for Patents
P.O. Box 1450
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I CERTIFY THAT THIS PAPER (ALONG WITH ANY PAPER REFERRED TO AS BEING ATTACHED OR ENCLOSED) IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE WITH SUFFICIENT POSTAGE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO:	
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	<u>Mary E. Bongiorno</u>
	Signature of person mailing paper

Sir:

APPEAL BRIEF UNDER 37 CFR 1.192(b)

This appeal is from the final rejection mailed on May 21, 2003.

REAL PARTY IN INTEREST

Air Products Polymers, L.P. is the real party in interest in the appeal. The assignment has been recorded at Reel/Frame 012762/0076.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-7 are pending and are being appealed. Claims 1-7 were rejected in a final office action dated May 21, 2003, and an advisory action mailed on February 3, 2004.

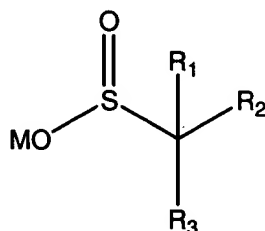
04/08/2004 CNGUYEN 00000076 010493 09699723
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STATUS OF THE AMENDMENTS

All amendments have been entered.

SUMMARY OF INVENTION

The invention relates to use of a special class of reducing agents that is part of a redox catalyst system for the emulsion polymerization of vinyl acetate, N-methylolacrylamide (NMA), and, optionally, another monomer. The reducing agents have the formula



wherein M is a hydrogen atom, an ammonium atom or a monovalent metal ion, R₁ is OH or NR₄R₅ wherein R₄ and R₅ each are H or C₁-C₆ alkyl; R₂ is H or an alkyl, alkenyl, cycloalkyl or aryl and R₃ is CO₂M. The preferred reducing agent is the glycolic acid adduct of sodium sulfite which is sold under the trademark Bruggolite FF-6. (page 6, lines 16-18, of the specification) One of the unexpected benefits of using these reducing agents as part of the redox catalyst system is that the polymer emulsion has reduced free formaldehyde content. (page 3, lines 1-14; and page 5, line 22 to page 6, line 18, of the specification)

ISSUES

There is one rejection presented in the final office action. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berghofer et al. (US 6,211,400) in combination with Applicants' disclosure.

GROUPING OF CLAIMS

Claims 1 through 7 are to be considered as one group.

ARGUMENT

The Examiner maintained the rejection of Claims 1-7 under 35 USC 103(a) as being unpatentable over Berghofer et al (US 5,211,400 B1) in combination with Applicants' own disclosure. The Examiner stated at page 3 first full sentence of the final rejection (paper number 15):

"It is tenable that the sulfinic acid derivatives (reducing agents) used in the emulsion polymerization technique of Berghofer et al would generate a final polymer emulsion governed by a reduction in formaldehyde since the vinyl acetate based polymer emulsion of Berghofer et al, as modified, is essentially the same as the claimed vinyl acetate based polymer emulsion and there is nothing iron clad on this record diffusing this issue."

In the office action mailed on May 21, 2003 (paper number 13), at page 4, first paragraph, the Examiner referred to the Background of the Invention at page 1, lines 20-21 and page 2, lines 1-15 of Applicants' disclosure as support for modifying the polymer disclosed in Run 11 of Berghofer et al. to include NMA as a co-monomer. However, Berghofer et al. does not disclose or suggest using a crosslinking monomer in the polymers disclosed therein and specifically does not disclose or suggest using NMA as a crosslinking monomer. Use of a crosslinking monomer, such as NMA, produces a distinctly different polymer than the polymers disclosed by Berghofer et al.

It should also be noted that page 1, lines 12-14, of the instant specification, reads: "Reduction of formaldehyde in vinyl acetate based emulsions has been achieved by using less favored reducing agents to the formaldehyde sulfoxylates, or by reducing the level of N-methylol acrylamide. ..."

Since Berghofer et al. teach that the sulfinic acid derivatives disclosed therein have a reducing action similar to formaldehyde sulfoxylates but do not eliminate formaldehyde before, during, and after use, it would not be expected that use of the sulfinic acid derivatives in producing polymers from vinyl acetate, NMA, and optionally another monomer, would result in a reduction in residual formaldehyde.

As the Examiner indicated, the reference is evaluated, as a whole, for what it fairly teaches. It teaches, as a whole, that the novel compounds disclosed therein can be used as reducing agents and will not eliminate formaldehyde before, during and after use. Berghofer et al. do not disclose or suggest polymerization in which residual formaldehyde is formed, such as when NMA is used as a co-monomer.

The ability to use NMA in the polymer and reduce the amount of formaldehyde that would typically be present in the resulting emulsion polymer is the value of the reducing agents of this invention. The formaldehyde-free reducing agent of this invention

unexpectedly reduces the amount of formaldehyde in the final polymer emulsion product derived from vinyl acetate vinyl acetate, NMA and optionally other monomers, compared to other formaldehyde-free reducing agents. See Example 2 of this specification in which polymers of vinyl acetate, ethylene, and NMA were produced using either ascorbic acid (sodium erythorbate) or Bruggolite FF 6 as reducing agent. Use of sodium erythorbate resulted in no additional formaldehyde being formed during the polymerization process. However, unexpectedly, use of Bruggolite FF 6, in the same process, resulted in a substantial reduction of formaldehyde. A summary of the 3 different runs reported in Example 2 is presented below:

Vinyl Acetate-Ethylene-NMA Polymer	Amount of Formaldehyde (ppm) using One of the following Reducing Agents:	
	Sodium Erythorbate	Bruggolite FF 6
A (Tg = -14 °C)	27.2	3.3
B (Tg = 10 °C)	57.1	8.6
C (Tg = 0 °C)	47.5	6.8

The above described reduction in formaldehyde is not reported by Berghofer et al. In fact, Berghofer et al state, at col. 4, lines 22-24, that the reducing compounds disclosed therein have a reducing action comparable to formaldehyde sulfoxylate; but they do not eliminate formaldehyde before, during, or after use.

The above data rebut a prima facie obviousness rejection based on Berghofer et al together with what is well known and admitted in the Background of this Invention.

It is therefore submitted that the claimed invention would not have been obvious based on Berghofer et al together with what is well known and admitted in the Background of this Invention. Berghofer et al do not teach preparation of polymers containing NMA, and do not teach or suggest that formaldehyde would be lowered during the preparation of polymer emulsions in which reducing agents described therein are used. In addition, the data in this case rebut a prima facie obviousness rejection based on Berghofer et al together with what is well known and admitted in the Background of this Invention.

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Reversal of the rejection is requested.

Respectfully submitted,

A handwritten signature in cursive script that reads "Mary E. Bongiorno".

Mary E. Bongiorno
Agent for Applicants
Registration No. 36,091

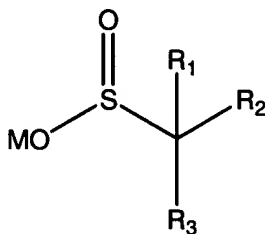
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APPENDIX

Claims Involved in the Appeal

1. In a vinyl acetate based polymer emulsion formed by the emulsion polymerization of vinyl acetate and N-methylolacrylamide, optionally other monomers, in the presence of a stabilizing system and a redox catalyst system comprised of an oxidizing agent and a reducing agent, the improvement for reducing formaldehyde emissions in the resulting vinyl acetate based polymer emulsion, which comprises:

forming said vinyl acetate based polymer emulsion utilizing as the reducing component of the redox catalyst system a reducing agent of the formula:



where M is a hydrogen atom, an ammonium atom or a monovalent metal ion, R₁ is OH or NR₄R₅ wherein R₄ and R₅ each are H or C₁-C₆ alkyl; R₂ is H or an alkyl, alkenyl, cycloalkyl or aryl and R₃ is CO₂M.

2. The vinyl acetate based polymer emulsion of Claim 1 in which the vinyl acetate based polymer comprises polymerized units of ethylene in an amount of from about 10 to 40% by weight of the polymer.

3. The vinyl acetate based polymer emulsion of Claim 2 wherein the N-methylolacrylamide is present in an amount of from about 0.5 to 10% by weight of the polymer.

4. The vinyl acetate based polymer emulsion of Claim 3 wherein the reducing agent represented by the formula is selected from the group consisting of: 2-hydroxyphenyl hydroxymethyl sulfinic acid-sodium salt; 4-methoxyphenyl hydroxymethyl sulfinic acid-sodium salt; 2-hydroxy-2-sulfinato acetic acid-disodium salt; 2-hydroxy-2-sulfinato acetic acid-zinc

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salt; 2-hydroxy-2-sulfinato propionate-disodium salt; ethyl 2-hydroxy-2-sulfinato propionate-sodium salt.

5. The vinyl acetate based polymer emulsion of Claim 3 wherein the vinyl acetate based polymer emulsion is formed using a redox catalyst system of hydrophobic hydroperoxide and the glycolic acid adduct of sodium sulfite.

6. The vinyl acetate based polymer emulsion of Claim 3 wherein M is sodium or zinc.

7. The vinyl acetate based polymer emulsion of Claim 3 wherein R₁ is OH.